MCOTEA
Journal

Unit Fire Hit Discriminator - Unique to the Marine Corps

Validating Warfighting Systems

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From the Director

Team, Stakeholders, Family, and Friends of MCOTEA,

First and foremost, congratulations and a sincere thanks for your unwavering dedication as we successfully closed out the fiscal year with the budget balanced and all funds meticulously accounted for. The next biggest accomplishment during these past few months was undoubtedly the release of MCOTEA's Operational Test and Evaluation Manual. This manual formalizes our position, practices, and approach to Test and Evaluation and is completely aligned with the governing policy of the DOD 5000 along with the SECNAV 5000. This effort is quite an achievement that will ultimately help the Corps refine Operational Test and Evaluation and quickly adapt to any policy changes in the future.

This edition of the Journal will highlight all levels of activities conducted over the past several months. MCOTEA's Expeditionary Team did an outstanding job conducting our core mission of the Test and Evaluation of the Light Armored Vehicle Command and Control Upgrade Variant in Twentynine Palms. This issue also highlights the sometimes underestimated importance of the Pilot Test, which MCOTEA performs before every Record Test.

We continue to gain momentum and move productively forward. This team never ceases to perform at a high level of proficiency and pride for which I am extremely grateful. Thanks for your dedication, support to the organization and its mission, and your professionalism.
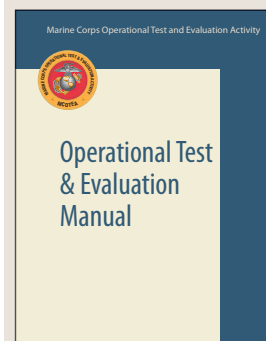
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Colonel Dave Reeves
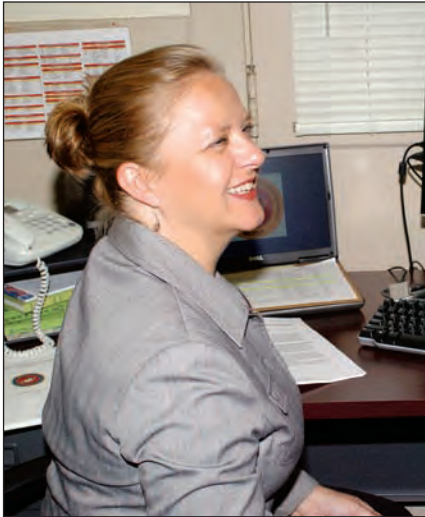Director
MCOTEA

In This Issue

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Getting Technical with Test Design

Ms. Shannon Krammes is the S-2 Decision Sciences Head. Ms. Krammes holds a Baccalaureate of Decision Sciences from George Mason University and a Master of Systems Analysis from the Naval Postgraduate School. She joined MCOTEA in 2004, supporting the Ground Combat Test Branch until transitioning to the S-2 in 2008.

1. What is the role of S-2 Decision Sciences within MCOTEA?

The S-2 provides decision science capabilities in evaluation strategy, analytical test design, and test concept development. We are also responsible for providing specialty services including Information Assurance (IA) assessment, Modeling & Simulation (M&S), accreditation of models and simulations for MCOTEA's use, Live Fire and Survivability assessment, techniques for determining Reliability, Availability, and Maintainability, and Human Factors support.

All new efforts entering MCOTEA begin with S-2 support, where we form an initial evaluation strategy for the test divisions. The S-2 also performs system evaluation after all testing is complete. To this end, we stay informed about new evaluation and test methodologies and instrumentation and propose how to apply them to OT&E.

2. What is the most interesting or challenging part of your job?

The most interesting *and* challenging part of my job is coordinating the technical expertise within the S-2 with the wide variety of complex programs at MCOTEA. Ensuring technical expertise coverage for all programs is a highly dynamic and challenging task. Managing resources from Human Factors, IA, Live Fire, and Operations Research allows MCOTEA to create the evaluation strategies, the evaluations themselves, and the associated reports that will yield necessary data to provide the most effective information for decision makers.

3. Design of Experiments (DOE) is an important discipline in the testing world. Could you explain its purpose and MCOTEA's use of it?

Classic experimental-design techniques are almost always the best way to plan and analyze tests to determine how well a test item can perform selected operational tasks. DOE follows a sequence of events and characterizes and predicts the behavior of Department of Defense acquisition system performance. DOE allows the tester to develop an efficient test design that can adequately consider the key factors and conditions that might affect the outcome.

MCOTEA, along with fellow Operational Test Agencies, recently signed a Memorandum of Agreement (MOA) with the Director, Operational Test and Evaluation, to "endorse the use of DOE as a discipline to improve the planning, execution, analysis, and reporting of integrated testing."

The MOA clarifies the importance of implementing DOE by pointing out its value in identifying and mitigating risk in all test activities, although a DOE-based test approach will not necessarily reduce the scope of resources.

Design of Experiments Sequence of Events

1. Describes the system's employment process, the sequence of actions that occur when typical users employ the system to deliver required operational capabilities.

2. Identifies factors and levels, which are independent variables, and selected settings used in the test.

3. Chooses a factorial design, which allows the tester to determine if factors interact.

4. Analyzes factorial designs.

To quote from the MOA, using "the discipline of DOE in all phases of program testing from initial developmental efforts through initial and follow-on operational test… affords the opportunity for rigorous systematic improvement in test processes."

4. What are your short- and long-term goals for the S-2?

Short term, I'd like the S-2 to continue to build and track the baseline policies and procedures needed to maintain current functions and to support future efforts. We have been working hard to ensure that organizational knowledge is captured, reused, and applied to achieve measurable positive effects for the organization.

Long term, I'd like the S-2 to determine how our expertise can be used to support the Marine Corps in a broader scope of efforts. Eventually, I would like to research the possibility of expanding to provide an operational research capability for the Marine Corps. This research capability would be sought after to conduct studies and provide evaluations that support the Marine Corps in many operational functions. In addition, other Services would seek this resource to conduct studies on future operations as they relate to the Marine Corps.

5. What is the difference between an Operations Analyst (OA) and someone with Operations Research and Systems Analysis (ORSA) capability?

Well, this is an interesting and ongoing discussion. It is probably better to formulate the question around the differences between Operations Research (OR) and Systems Analysis (SA).

Operations Research focuses on the unitary decision maker at the more tactical or operational level and uses methods such as search theory, routing optimization, operational assignment problems, scheduling, inventory models, and queuing problems. Typically, in this area of study, the data is available to give precision in the outcome.

The term Operations Research is interchangeable with the term Operations Analysis, which was "born of war in the 1940s." It encompassed physical scientists and others addressing problems in radar operations, antisubmarine warfare, and air operations. The main focus was on empirical evidence, operations design, search, and testing.

Systems Analysis was "born of bureaucracy in the 1950s." The focus was on system-level design and decision making. Operations Research is just one tool the Systems Analyst uses to support the decision maker. Systems Analysis focuses on the operational, strategic, and policy level where the input is usually less well known. In this larger view, precision is often unlikely and risk mitigation is often the focus of the study.

Both Operations Research and Systems Analysis are necessary to evaluate the complex weapons systems and the environments (militarily and politically) in which they are deployed.

6. How did you become interested in Systems Analysis? Is this a good field for students to think about?

MCOTEA's role is to provide decision makers with the information they need to do their job. When I began to research my graduate-level studies I was very excited to find a program directly related to the day to day operations of the S-2. The Naval Postgraduate School Master of Systems Analysis is specifically designed to meet the needs of the Navy and other Services as a basis for aiding key decisions on Force requirements, weapon systems, and other defense matters. The curriculum focuses on areas that are of great importance to the S-2's mission to include formulating problems, using the analytical process to design study requirements, highlighting critical assumptions, recognizing strengths and weaknesses of applied analytical methodologies, and study recommendations.

This is an excellent field for students to consider and has a broad area of application. The Naval Postgraduate School program is available to all U.S. Military Officers and U.S. Government Civilians. It is fully funded for Navy and Marine military students and government employees reporting to a USN/USMC command.

I highly encourage others in the MCOTEA workforce and the wider government workforce to pursue the excellent opportunities provided by the Naval Postgraduate School programs. ⚓

Interested in working as an ORSA? Here are some typical ORSA responsibilities in the workplace:

- Formulate mathematical or simulation models of problems, relating constants and variables, restrictions, alternatives, conflicting objectives, and their numerical parameters.

- Analyze information obtained from management to conceptualize and define operational problems.

- Collaborate with senior managers and decision makers to identify and solve a variety of problems.

- Define data requirements and gather and validate information, applying judgment and statistical tests.

- Design, conduct, and evaluate experimental operational models in cases where models cannot be developed from existing data.

6

Quick Facts about MCOTEA's New Operational Test and Evaluation Manual

A year in the making, MCOTEA published its new Operational Test and Evaluation Manual in February 2010. This manual significantly updates, refines, and augments MCOTEA policies and procedures for test and evaluation, all in accordance with SECNAVINST 5000.2D/E, DODI 5000.02, and U.S. Code 10 § 2399. The summary presented here highlights key concepts that MCOTEA's Scientific Advisor, Chief of Test, and Decision Sciences Lead developed with assistance and dedication from the MCOTEA staff at large.

1. Overarching Evaluation— Strengthening the "E" in MCOTEA

As the Operational Test Agency for the Marine Corps, MCOTEA is charged with both the operational testing *and* evaluation of systems. MCOTEA has long excelled at operational test and now has the tools and resources in place to give evaluation its due. Proper evaluation can only result from the accumulation of data and facts about a system over its acquisition life cycle, not from a single operational test. An overarching approach assures decision makers that MCOTEA's final report is wholly credible and defensible because it is based on evaluated test results spanning the program's history.

2. Seamless Test and Evaluation Process

MCOTEA now builds a System Evaluation Plan (SEP) as soon as a program enters the door, covering the acquisition cycle from before the first DT event to final OT. The SEP is MCOTEA's three-part plan for analyzing data from specific types of assessments and operational tests. Part I defines the system, including the crew or unit that is intended to receive the system. Part II is the Evaluation Framework, which identifies the Evaluation Questions that must be answered and provides traceability to the capabilities documents. A major feature of Part II is Operational Task Analysis, which breaks down complex evaluation problems into more manageable parts. Finally, Part III of the SEP describes the technical evaluation methods MCOTEA will use in evaluating test results.

System
Evaluation
Plan

3. Better Integration with Developmental Efforts

MCOTEA's involvement now begins very early in the acquisition cycle, with the goal of becoming involved in a new program as early as the formation of the Requirements Transition Team. Early involvement includes early program reviews, demonstrations, developmental working groups, source selection testing, modeling and simulation activities, and other technical developmental work.

4. Simplified Document Templates

MCOTEA now uses just two essential templates, one for plans and one for reports, regardless of the type of test event. (Certain documents such as the TEMP and FD/SC Charter retain separate formats.) Test documentation is written in a standardized, repeating format based on the scientific method, which allows each document to "feed" the next one, creating ease of use, consistency, and traceability throughout a program's T&E history.

5. Continued Rigorous Test Execution

Test Managers know their business and now have better tools and a simplified process to support them. Linking test plans to the SEP is the first important step in providing a clear and consistent way forward. But MCOTEA has also reduced the number of test "steps" to six basic functions, which aligns with the scientific method:

- Plan the evaluation
- Match test events, schedule, and resources to the evaluation plan
- Plan individual test events
- Conduct test events
- Analyze and report test results
- Evaluate and report test results

6. New Emphasis on Feedback

MCOTEA continually strives to improve its processes to ensure that tests, analyses, and evaluations are relevant, timely, accurate, unbiased, and operationally useful. To this end, MCOTEA solicits feedback from diverse sources, such as the Program Manager, Milestone Decision Authority, and the Warfighters themselves. The intent in soliciting Warfighters in particular is to determine areas of deficiency that may not have been identified during OT&E.

MCOTEA Test and Evaluation Process
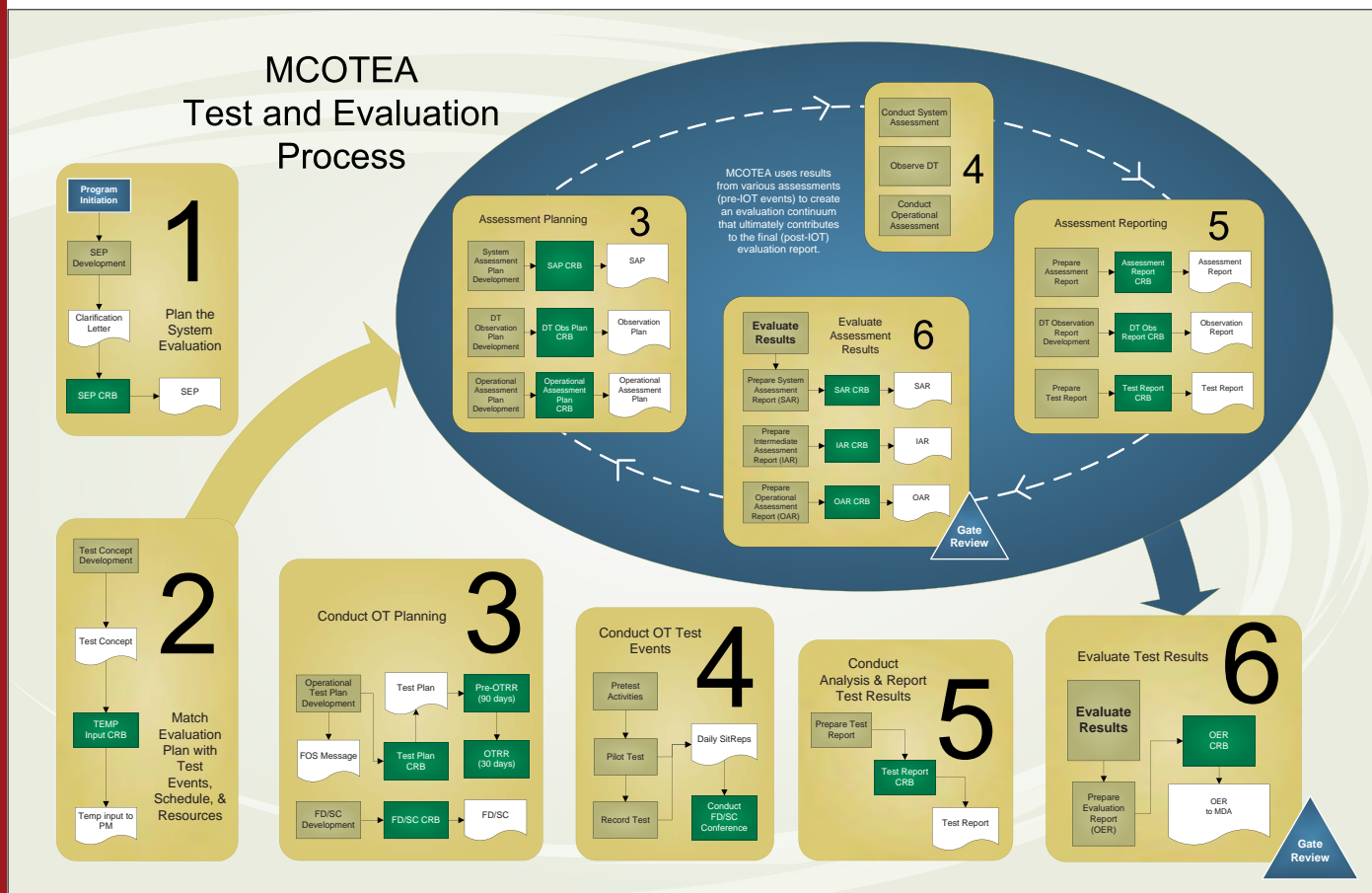
MCOTEA's 6-Step Process

MCOTEA groups its test and evaluation process into six steps, which are based on the scientific method. Each step of the operational test process yields a product, beginning with the System Evaluation Plan, which sets out the framework and methods for evaluating data collected over the life of the test program.

Other steps yield products such as a test plan, a test report, or an evaluation report.

Evaluation of test data—both developmental and operational—is an iterative process that occurs throughout a program's testing life. After the TEMP is established, a cycle of pre-IOT assessments occurs, as seen in the oval in the diagram above. These assessments contribute data to the final, post-IOT evaluation.

Within the iterative assessment cycle, each step yields a product, in the form of a plan, a test report, or an assessment report. At the assessment level, reports do not conclude Operational Effectivenes, Suitability, or Survivability (OE/OS/OSur).

Once the operational test is over, the MCOTEA system evaluator assigned to the program aggregates the data from all assessments and the operational test. Using the models originally set up in the SEP, the evaluator determines OE/OS/OSur.

Operational Task Analysis

MCOTEA performs an Operational Task Analysis early in SEP development. Task analysis is a process adapted from System Engineering, which is at the heart of the acquisition process. The completed task analysis becomes the backbone of the Evaluation Framework found in the SEP.

The usefulness of the Operational Task Analysis does not end with the SEP, however. Continuing from there, the MCOTEA test team re-uses the task analysis to determine the process flow when defining a mission-based trial.

In addition, the test team continues to use the task analysis to define mission essential functions for Failure Definition/Scoring Criteria.

Finally, the test team uses the task analysis to validate that the training provided to operators and maintainers adequately covers all tasks to accomplish the missions.

Thus, using a single tool such as Operational Task Analysis contributes to a consistent and seamless test and evaluation process. ☙

Suiting Up for New Challenge

What do rugby and MCOTEA's new Deputy Director have in common? Ask rugby players what it takes to play, and the refrain is common: speed, strength, and agility, complemented by quick thinking, determination, and heart. As it happens, MCOTEA's new deputy, Mr. Thomas McGowan, played rugby for 20 years all over the world, a pastime he enjoyed while building a career in test and evaluation.

He came to the testing world fairly naturally, having a broad technical background: a Bachelor of Science in Chemical Engineering, Certification as Nuclear Engineer in the Navy, and a Master of Science in Physical Oceanography. However, he came to rugby unexpectedly, when he was introduced to the sport during his tour at Holy Loch, Scotland, while in the Navy. After a half-dozen games with the locals during off-duty time, he knew that rugby, like a good career, captures your best qualities and won't let you go.

In his new position at MCOTEA, which he assumed in February, Mr. McGowan expects to apply his experience in various ways. "One of my first objectives, besides keeping the trains running, is to begin an internal review designed to capture individuals' best ideas. I have already heard a number of good ideas that would improve the way we work," says Mr. McGowan. "Now I would like to assess and evaluate these ideas and develop a structured plan for future implementation to best benefit the organization with no impact on the day-to-day business of supporting MCOTEA's mission."

An example of this would be to integrate multiple tracking systems that have been developed to manage the information flow of 100+ test and evaluation efforts underway at MCOTEA at any given time. Mr. Mc-Gowan's background in process development enables him to see beyond spreadsheets to design systems that function as genuine management tools.

While still in the Navy, Mr. McGowan learned process-building through various experiences, in particular, approximately 6 years in a Joint billet at the Defense Threat Reduction Agency (DTRA) in Albuquerque, NM. There he planned and developed methods and pro-

cedures for implementing high explosive testing for Research and Developmental Testing and Operational Test and Evaluation. "It was an end-to-end process. DTRA was developing weapons for defeating multiple types of chemical and biological facilities. Tests were developed to capture the data and to evaluate the results from weapon release off operational platforms through the weapon's effects against realistic targets with simulated chemical or biological agents. Tests of this magnitude took about a year for planning, constructing the targets, and fielding the instrumentation packages for an event that was over in less than 30 seconds. There were no second chances for data collection in these live fire events; the test bed structure would be destroyed."

This hands-on experience with testing and evaluation led to Mr. McGowan's continued interest in the subject and progression towards MCOTEA. After retiring from the Navy, he worked as a contractor, once again supporting DTRA, this time on the program and requirements side. From there, still as a contractor, he supported the MAGTF C4ISR Division at MCOTEA in 2008, gaining basic experience with the MCOTEA process.

One more opportunity presented itself before Mr. McGowan returned to MCOTEA as deputy: assigned to a different contract, he helped stand up the office of Director, Developmental Test and Evaluation, in June 2009.

With such a gamut of T&E experience, he brings extraordinary perspective to his new position.

Initially and internally, Mr. McGowan wants to build on the organizational efficiencies instituted by Col Reeves. He expects to effect positive change based on the desire he sees throughout the organization for process improvement and the rigor and quality of MCOTEA's test and evaluation capabilities.

Longer term and externally, Mr. McGowan expects MCOTEA's expanding value to the Marine Corps to keep it deeply engaged in DOD priorities such as Rapid Acquisition. "A big challenge for testers is to change an erroneous perception out there that we are speed bumps on the road to acquisition. Good testing has to be done, by law, for reasons of safety and effectiveness. But we also have to be ready to respond to a short timeline. We have to be ready to test when the product is ready to be tested."

For now, Mr. McGowan is getting his hands around the new job and is looking forward to the challenges ahead. ⚓

Mr. Tom McGowan brings extensive T&E experience to MCOTEA and looks forward to contributing to positive change.

Run Your Tactics—UFHD Will Tell You What Happened

The Unit Fire Hit Discriminator (UFHD) (pronounced u-fid) began development in 2008 in response to MCOTEA's need to capture standard hard data for evaluating small arms weapons while also capturing data for soft requirements such as enhanced individual maneuverability and displacement. MCOTEA submitted the UFHD concept to DOT&E's Central Test and Evaluation Investment Program as a candidate for Resource Enhancement Project funding and canvassed industry for potential UFHD solutions.

Now ready for use in the testing of small arms, the UFHD is unique in important ways: it allows the use of live fire in unconstrained schemes of maneuver against targets of the shooters' choosing; it is unobtrusive to units conducting the test event; and it correlates each shot event (handling more than 2,000 shot events per minute) with a hit or miss event, yielding a wealth of information from complex algorithms. This information will allow MCOTEA to evaluate squad effectiveness at three levels: the individual Marine, the fire team, and the squad as a whole.

Given its capabilities, the UFHD can be thought of as a dynamic scorecard. Using two Global Positioning System Receivers, one on the target and one on the weapon player pack, UFHD measures the location of shooter and target, the timing synchronization between shooter and target, the time and location of hit, and most important to small arms testing, the direction from which the bullet came as it hit. The UFHD's ability to measure the bullet's 3-dimensional direction is made possible by the addition of a third cluster of sensors on the Location of Miss and Hit (LOMAH) bar, a custom feature of the equipment.

UFHD's capabilities make it possible to detect the accuracy of an individual shooter's burst types. For example, UFHD may reveal that a shooter's 3-round burst is more accurate than his 5-round burst, or it may reveal the opposite. Another example of looking at the data would be to say that of seven 5-round bursts, only 30 percent reached the user-defined suppression zone. Taken together, the data on the entire squad will give decision makers precise and in-depth information on weapon performance that they could not have received from any other test instrumentation.

MCOTEA will have available 48 weapon player packs, 14 target lifters with LOMAH controllers, 1 Toughbook controller, 2 docking stations, and 1 alignment set-up tool.

In addition to using UFHD in the operational testing of small arms, MCOTEA expects to employ it in other types of programs as well. The system's versatility allows it to be used in a variety of environments, meaning that its training utility can be applied to nearly any test involving live fire that MCOTEA needs to conduct. MCOTEA's Expeditionary Test Division, for example, is interested in adapting UFHD for some of its future testing. UFHD can transition from measuring thousands of shots from individual rifles to measuring those of a large vehicle-based system because of the complex correlation software at its core. The hardware itself is relatively incidental to how UFHD is used.

The Advanced Target System

UFHD: A Unique and Powerful System for Analyzing Data

Weapon Player Pack (WPP)*

Pressure Sensor

GPS Antenna

red

2 LEDs

green

WPP Status and Functional Information

On/Off Switch

Connections for Downloading Data and Recharging WPP

Standard Rail Connector

(All New for UFHD)
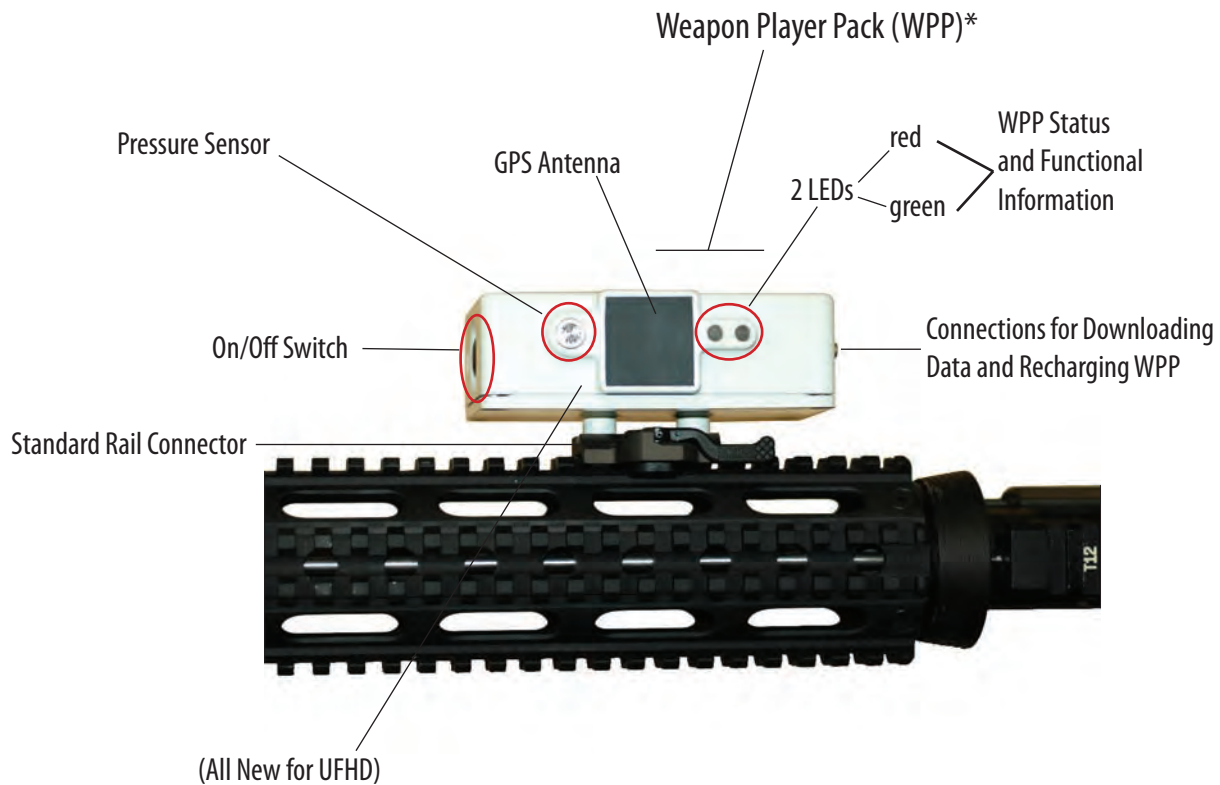
*Sensor can identify more than 2,000 discrete firing events per minute.

Target

Lifter

Custom-built LOMAH Bar for MCOTEA Application*

Third cluster of sensors uses complex algorithms to gather X + Y coordinates of hit and direction the round came from.

Controller

Information is gathered, processed, and transferred via USB port.

GPS Antenna

Battery
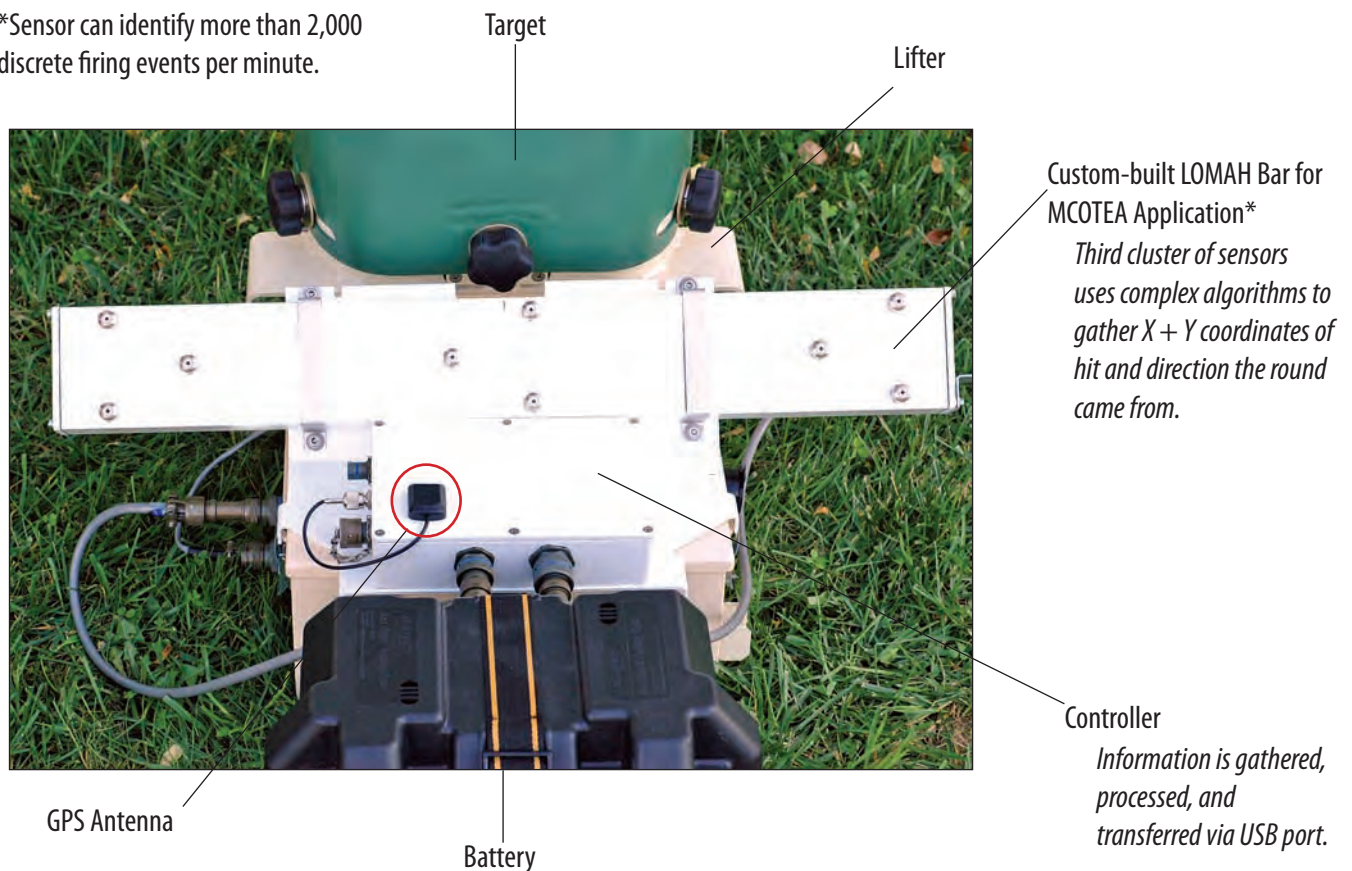
No matter which test program UFHD supports, it brings an innovative and even revolutionary dimension to overall training. Beyond the particular needs of IOT&E testing, application of UFHD extends to training evaluation and tactics assessment. With UFHD, the Marine Corps and other users can train–measure–retrain and then test for improvement. For example, UFHD makes it possible to learn when the situation becomes optimal for shifting between semiautomatic and automatic at different distances. The most effective distance for employing different types of fire can now be backed up with data completely unavailable before UFHD.

In effect, the days of counting holes on a target are over. Perhaps even more important, UFHD reveals what happened around or beyond the target, providing detailed information that allows tactics, techniques, and procedures to be developed with greater effectiveness.
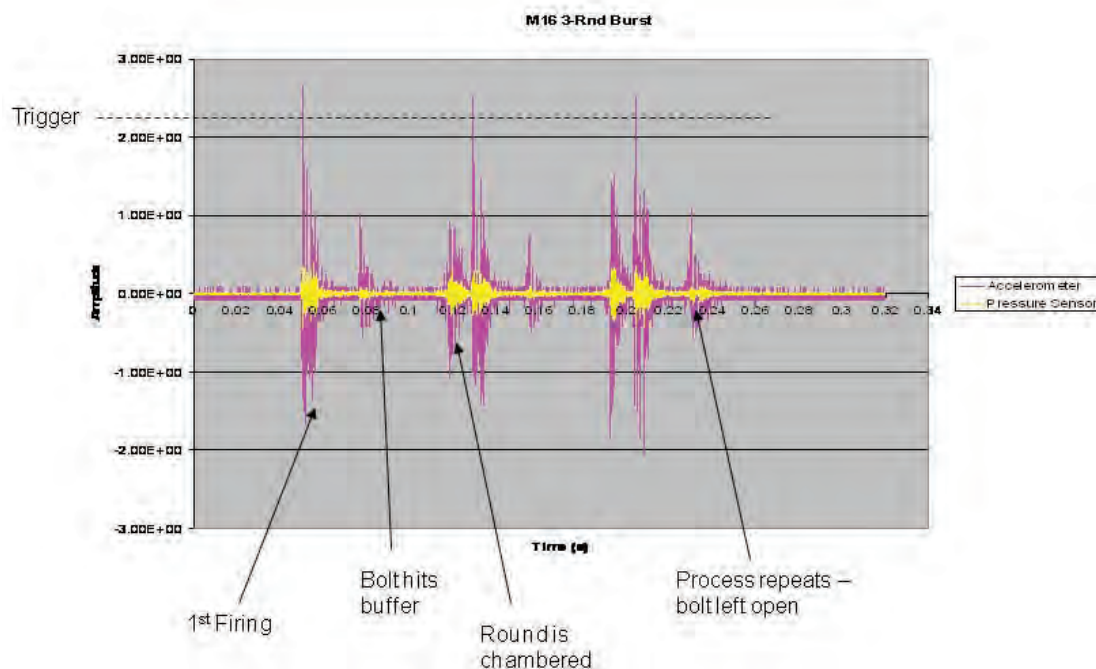
Whether at the acquisition level of developmental and operational test or at the individual unit training level, UFHD will vastly enhance weapons analysis and training effectiveness. The Marine Corps Training and Education Command and the Army testing community have expressed interest in seeing the UFHD perform in operational testing. By this spring UFHD will have something to show. ⚓

Toughbook Control Center

Portable Base Station recharges unit and downloads data to computer.

Shot Detection, as seen in the illustration below, profiles the entire firing process within each type of weapon deployed during the test. This profile is an example of a 3-round burst fired from an M16 A1 rifle.

M16 3-Rnd Burst

Trigger

Accelerometer
Pressure Sensor

1st Firing

Bolt hits buffer

Round is chambered

Process repeats – bolt left open

"The days of counting holes on a target are over."

Meet Rosie Diaz. She Has a Job for You

Ms. Rosemary Diaz recently joined MCOTEA as the S-1 Lead.

Ms. Rosie Diaz recently joined MCOTEA as S-1 Lead, bringing to the activity a level of Human Resource professionalism directly in line with the Director's vision for the future. With 23 years of H.R. experience, Ms. Diaz has, in her words, "the big picture" of human resource management, from filling immediate staffing needs to skill gapping and fulfilling long-term organizational goals.

"I began as a clerk here at Quantico," Ms. Diaz relates, and through multiple moves with her Marine husband, was able to learn and grow in other H.R. positions wherever she lived. Although forced moves can sometimes interrupt a career, Ms. Diaz says she benefited from the need to adjust and remain flexible. She credits her exposure to multiple new challenges with making her a good manager.

Now back at Quantico, Ms. Diaz says she had been aware of MCOTEA while working in other positions and was curious about its mission. When the S-1 Lead position became available, Ms. Diaz knew she should learn more. After meeting with Col Reeves, who in her words is "passionate about the organization," she knew she made the right decision by accepting the job. "He is excellent at in-briefing and in sharing his vision," she says.

Today she is involved with every element of human resource management at MCOTEA. In addition to reviewing résumés and writing new position descriptions, she also advises senior management on setting short- and long-term goals and filling critical needs. In particular she focuses on MCOTEA's need to fill entry or mid-level technical knowledge billets. MCOTEA has a solid core of veteran operational testers with seniority and deep institutional knowledge. Now, she says, it's critical to add new personnel who will grow to be the next generation of senior MCOTEA leadership.

The short-term goal is to fill vacant positions with highly qualified individuals as quickly as possible. Ms. Diaz looks for a combination of traits in a candidate, beginning with the requisite technical knowledge but supplemented by good communication skills and the ability to transition into new work smoothly. "We're looking everywhere for candidates," she says, "through word of mouth, networking, you name it."

MCOTEA's long-term personnel management goals are to provide the training and resources needed to build retention and to provide skill-gapping that enables staff to step up. "We will cross train and develop staff, always looking for those opportunities to encourage unique skills," adds Ms. Diaz.

When asked what she finds to be unique about MCOTEA itself, Ms. Diaz quickly responds, "the commitment from the staff." She noticed immediately upon arriving that MCOTEA personnel are hard working and excited about what they do. "They clearly strive to make things better and more effective every day. They make a difference daily."

MCIAAT Receives Chairman's Award

Members of Team BAE Systems who support the Marine Corps Information Assurance Assessment Team (MCIAAT) recently won a BAE Systems' Chairman's Bronze Award for enhancing customer performance for their work supporting II Marine Expeditionary Force. Team BAE Systems participants deployed to Iraq to support Operation Iraqi Freedom–09.1. The team provided detailed IA Assessments of II MEF Forward-deployed tactical networks, remediation services for networks assessed, and critical data network support to the Marines of Multi-National Force–West. Team members conducted the assessment in a combat environment under harsh operating and living conditions. They provided II MEF with a comprehensive baseline of their networks and presented a complete remediation strategy to correct or mitigate all discovered vulnerabilities, both technical and non-technical.

MCIAAT members assessed and remediated over 13,000 node systems via hardware and wireless connectivity at three operational locations in less than 1 week for each site—an impressive level of productivity even for larger teams. This mission was part of MCOTEA's participation in the Congressionally mandated IA Interoperability initiative, which began shortly after September 11, 2001, and ensures computer network defense best practices within DOD. The effort to sustain and support this operation went above and beyond normal expectations.

The team was led by Capt Rob Davis, MCOTEA, and was composed of a deployed element and a support element.

Pilot Test: More Than

All is ready: the system under test is in place at the test site, in this case a range at Twentynine Palms, CA. The test team, including Operating Forces, is assembled in the clear desert air, boots crunching on sand, eager to begin. After months of detailed planning, accounting for everything from rounds of ammunition to bottled water, the Operational Test Project Officer can signal the start of test. But not the Record Test. First, the Pilot Test, an essential component of overall test success.

MCOTEA develops a unique

Above left, data begins to roll in from practice events. Each group of lines represents target up/target down. Left, an operator awaits command from his fire team leader.

plan for each system being tested. The procedures developed within a test for executing a mission are specifically written for that system, and MCOTEA will run them for the first time at the test site. For these reasons, MCOTEA always performs a Pilot Test, whether for half a day or a full week, depending on test complexity, to ensure that procedures can be executed and data collected as designed. Going directly to Record Test is not an option, given the amount of resources that could be squandered if adjustments could not be made to the plan.

In a recent test involving the suppressive capability of squads equipped with different weapons, the Pilot Test ran for a full week, performing a total of 41 trials with both day and

a Check in the Box

night operations. The days were long and the nights were cold, but the test team obtained invaluable information about the validity of their assumptions in designing the test. From this they adjusted procedures for test efficiency, adjusted the timing of mechanical targets, and ensured that the data being collected fulfilled the test plan's data requirements.

Pilot testing also serves a purpose crucial to the accuracy of data. From an analyst's perspective, an operator should be proficient in using the system under test, not just trained. An operator who is merely trained will provide data, but the data will be grounded in a learning curve, diminishing the true measure of mission accomplishment. Conversely, a long Pilot Test allows an operator to increase his level of knowledge and expertise, burn through the learning curve, and emerge into proficient status. Data collected from that point forward is truer to mission accomplishment than data collected from lesser trained operators.

A Pilot Test is a dress rehearsal for the real show, and like any dress rehearsal has its bumps, delays, and moments of agitation as plans seem to be going awry. The recent squad comparison test, depicted here, was no exception, but the payoff was huge. The Record Test went off without a hitch.

PITS, the Portable Infantry Target System (right). A few targets required timing adjustments as practice trials continued.

13

Pilot Testing Makes It *Right*...

Early in the Pilot Test, test team members work to solve a problem discovered with the handheld data collection devices.

The test team had planned for target Data Collectors to juggle stopwatches and stopwatch printers in the field along with their NVGs. However, the test team quickly learned that too much equipment plus tough terrain would force a change to their data collection plan. Above, a Program Analyst discusses data collection issues with Data Collectors.

The daily rhythm during Pilot Testing ebbs and flows between periods of intense activity and less intense waiting time for the next trial to begin. Down time is essential not only for rest but for allowing the test team to assess what is working and what is not.

Adjustments to target lifting time are calculated in the sand after the Senior Operations Analyst (left) and the Scientific Advisor realized that a particular target's lifting time was skewing data.
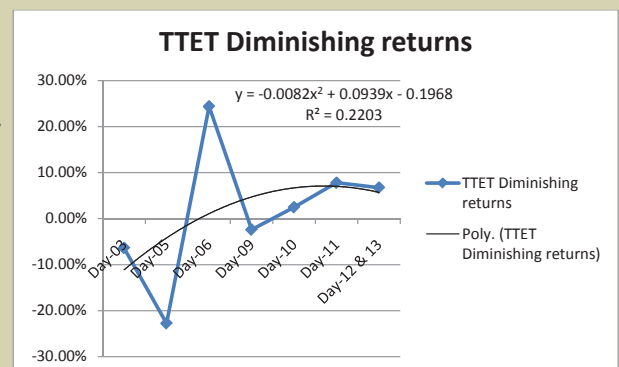
...and Makes It *Ready*

The need to count unexpended rounds led to using a board as a simple measuring device (left) after operators returned from the practice trial. This measurement was part of validating the process for determining the number of rounds fired in an attack.

Operators practiced the attack (above) to help ensure valid data collection. Nighttime operations were also run.

Reload time

$y = -70.46\ln(x) + 215.2$
$R^2 = 0.9436$

68.4% Improvement

Reload Time
Log. (Reload Time)

TTET Diminishing returns

$y = -0.0082x^2 + 0.0939x - 0.1968$
$R^2 = 0.2203$

TTET Diminishing returns
Poly. (TTET Diminishing returns)
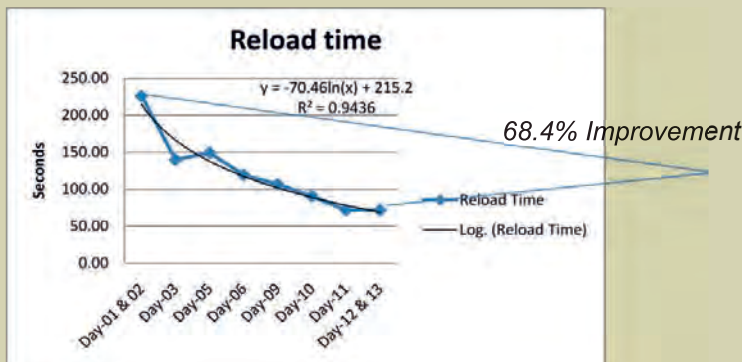
By the end of the Pilot Test, operators' reload time (above left) had improved significantly. The learning curve (above right) for Total Target Engagement Time, the test's most critical element, reflected continuous learning among all test team members as they operated more efficiently and adapted to new procedures. The curve leveled off early in the Record Test, leading to data that more accurately reflected mission accomplishment.

R2C

During Operation Iraqi Freedom and Operation Enduring Freedom, U.S. Forces came across something that they had never encountered so prolifically: IEDs. To forestall such explosions, Marines of the past had only the option of probing for mines on all fours or using a handheld mine detector. And although Mine Resistant Ambush Protected (MRAP) vehicles provide an extraordinary layer of protection, the Marine Corps is continually looking to improve safety against IEDs and ambushes. The Route Reconnaissance and Clearance (R2C) Family of Systems (FoS) is the next step in making this happen, and MCOTEA is employing its expertise in designing test plans to help ensure that testing of this new capability is as effective as possible.

MCOTEA is now entering this effort because Marine Corps Systems Command (MCSC) is combining multiple programs (some that are already programs of record and others that have been fielded under Urgent Universal Need Statements) into a single program of record for the purpose of route reconnaissance and clearance. By making the R2C FoS a program of record, MCSC will reduce the effect on the receiving units through the creation of an official Table of Equipment/Organization authorizing the units to have and maintain the equipment. It will also produce a standard (or base) set that may be task-organized to complete the mission and create standardized training throughout the USMC. Finally, combining these programs will provide a single point of contact at MCSC for the engineer units receiving this capability.

The R2C FoS capability set helps mitigate the threat of mines, IEDs, and obstacles along routes in the MAGTF Area of Operations by performing route reconnaissance and clearance through detecting, interrogating, marking, reducing, and clearing explosive hazards, thus ensuring friendly forces' mobility. The R2C FoS will be resident within the Combat Engineer Battalion in the Marine Division, Engineer Support Battalion in the Marine Logistics Group, and Marine Wing Support Squadron in the Marine Wing Support Group. A generic R2C FoS set will consist of CAT I/II/III MRAPs (Cougars, Buffalos, and Cougar JERRVs), Vehicle-Mounted Mine Detectors, robotics, removable mine rollers and lightweight route clearance blades, and varying electronic equipment. Currently, the development of the R2C FoS has been broken down into three increments, with Increment I expected to be fielded within the next couple of years. Increments II and III continue to build upon the R2C FoS with known updates to various pieces of equipment and the addition of some newly developed electronic equipment, to include the possible addition of newer, blast-resistant vehicles.

In August 2009, MCSC formed a Test Integrated Working Group (TIWG), which included members from MCSC, MCOTEA, and Marine Corps Combat Development Command. MCOTEA has been closely involved with MCSC on this effort, with Maj Michael Hobbs serving as the Operational Test Project Officer and as an Operations Analyst leading the charge for MCOTEA.

The R2C FoS TIWG members have put the finishing touches on a TIWG Charter and are currently in the Test Concept Development phase, working toward Production Qualification Test, Limited User Evaluation, and Field User Evaluation starting in FY11. ☙

R2C Family of Systems

- CAT I/II/III MRAPs (Cougars, Buffalos, and Cougar JERRVs)

- Vehicle-Mounted Mine Detectors

- Robotics

- Removable mine rollers

- Lightweight route clearance blades

- Varying electronic equipment

Military Operations Research Society
78th Annual Symposium

At this year's MORS Symposium scheduled for 22–24 June, MCOTEA's S-2 Decision Sciences Lead, Ms. Shannon Krammes, will host the Test and Evaluation Working Group (Mr. Paul Johnson, Scientific Advisor, will co-chair the group.)

The goal of the Test and Evaluation Working Group is to give Service, government, academic, and industry testers as well as members of the Operating Forces an opportunity to share lessons learned in order to improve experimentation strategies and methods. The group will address test designs, sample sizes, Measures of Effectiveness, incorporation of experiments, data collection efforts, timeliness of evaluation, and more.

In keeping with the symposium's theme—Leveraging Operations Research for Global Security Operations—the working group will focus on sharing findings, methods, and analytic tools.

Point of Contact:
Ms. Shannon Krammes
(703) 432-0945

S-2 Stresses Rapid Response

The Defense Science Board Task Force released a report last July on *The Fulfillment of Urgent Operational Needs*, an important statement about the need for improving rapid acquisition. Ms. Shannon Krammes, Decision Sciences, reviewed the report for MCOTEA and briefed an all-hands session of Professional Military Education on the major points of this report. "The strongest idea that came out to me is that we need a new approach to rapid acquisition," says Ms. Krammes. She stressed that this new approach does not need to be built from the ground up; MCOTEA already possesses many of the tools needed to get the job done. She said MCOTEA can begin by strengthening coordination with its requirements and development partners and by applying the best existing practices and lessons learned to its own practices of test and evaluation. However, she also emphasized the need for a change in perspective. "Especially in rapid acquisition, test and evaluation should not be a pass/fail test," says Ms. Krammes, "but rather should be used to determine capabilities and limitations of the system." MCOTEA continues to explore ways to improve rapid response time.

Collaborating with Commanders

From 21–23 October 2009, MCOTEA hosted the Operational Test Agency Commanders' Conference in Stafford, VA. Representatives from all Operational Test Agencies (OTA) including Scientific Advisors were present for a special Scientific Advisors' panel and to discuss the most important issues facing the test and evaluation community today. Dr. Seglie, DOT&E, chaired the Scientific Advisors' panel, held the day before the official start of the conference, and focused on Design of Experiments. ATEC, AFOTEC, COTF, and JITC provided examples of using Design of Experiments and lessons learned.

Dr. Gilmore, the recently appointed Director of Operational Test and Evaluation, attended the event and discussed his priorities. All OTAs had an opportunity to update the community on their latest concerns and advances. MCOTEA looks forward to participating in upcoming conferences with fellow OTAs.

East Meets West

In May 2009, MCOTEA opened the doors to its West Coast Test Site Support Facility at Camp Wilson, Twentynine Palms, CA. With real estate at a premium, making MCOTEA's West Coast footprint a reality took over a year to complete, but the effort was well worth it. The facility provides 3,200 ft^2 of flexible space for classrooms, storage, computer servers, and conferences.

In addition, the facility provides cost savings to test programs by stocking basic gear and instrumentation that formerly had to be shipped cross country for each test. MCOTEA performs approximately 60 percent of its operational testing at Twentynine Palms. To manage the facility properly and ensure that test personnel can hit the ground running, MCOTEA recently completed a personnel action for locally based logistics support.

The Light Armored Vehicle Command and Control Upgrade (LAV-C2U) test team, the first to use the facility, returned from its test praising the structure. The facility served the test team as a Combat Operations Center (COC) and provided an appropriate venue for signing the LAV-C2U final report (see next story).

Col Reeves signs the LAV-C2 OTA Evaluation Report at Camp Wilson.
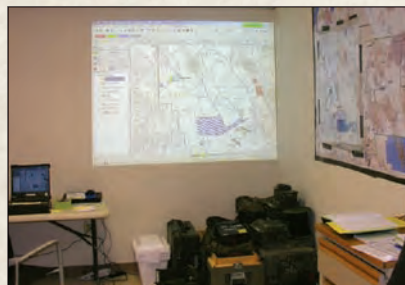

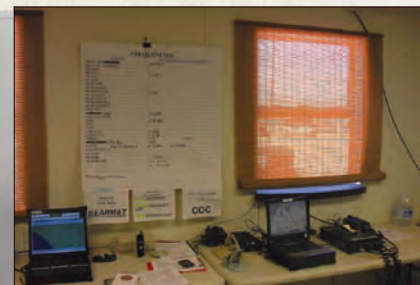*An exterior view of MCOTEA's facility at Camp Wilson*

The Insider's Perspective

The West Coast facility provides room for storage, conferences, and MCOTEA personnel offices.

The LAV-C2 test team set up and manned its COC within the MCOTEA West Coast facility.

Expeditionary Test Division Takes to the Desert

The Expeditionary Test Division (ETD) completed a Follow-on Operational Test and Evaluation (FOT&E) of the Light Armored Vehicle, Command and Control Upgrade (LAV-C2U) at Twentynine Palms, CA, from 3–14 August 2009. The FOT&E addressed concerns with Operational Effectiveness identified during the Initial Operational Test and Evaluation (IOT&E) conducted at Camp Lejeune, NC, from October–December 2007. PM LAV was directed by the Milestone Decision Author-ity to address and correct MCOTEA's concerns before a Milestone C deci-sion would be made.

The LAV-C2U provides the em-barked battalion commander and staff as well as the com-pany commander and Fire Support Team (FiST) with the ability to func-tion as a tactical ech-elon command post. The LAV-C2U pro-vides an encrypted voice communica-tion capability over SATCOM, High Frequency (HF), Very High Frequency, and Ultra High Frequency Line of Sight nets. Additionally the LAV-C2U pro-vides data communications via UHF and SATCOM, to include use of Command and Control Personal Computer, Advanced Field Artillery Tactical Data Systems, and SparkChat. Position location and data from C2PC is sent and received over the added En-hanced Position Location Reporting Systems.

The LAV Test Team (Expeditionary Test Division) was the first to conduct a test from MCOTEA's new facility in Camp Wilson, Twentynine Palms (see pre-vious story). The MCOTEA Test Site Support Facility (MTSSF) provided a high level of flexibility, support, and access to training areas aboard the base. "Use of this facility will go a long way towards reducing the level of support leveraged from the Operational Forces as was typically seen in past testing. With over eight office spaces, a large main conference room, and a storage room, the LAV test team was able to conduct operations dur-ing execution phase with 24/7 support via a Combat Opera-tions Center, while simultaneously con-ducting data reduc-tion and planning for future phases of the FOT&E," said Maj Tim Hough, Op-erational Test Proj-ect Officer (OTPO) for the LAV-C2U FOT&E.

The COC allowed the OTPO and Divi-sion Head to main-tain constant situa-tional awareness via voice and data with the test team while they conducted two 48-hour Opera-tional Mission Pro-files (OMP) along the west side of the Twentynine Palms training space.

LAV-C2U on the move

A highlight of the test was the successful demonstration of HF communications on the move (an objective requirement) and the use of the OS-302 SATCOM antennas.

During execution of the LAV-C2U FOT&E the test team conducted back to back OMPs with two production-representative test articles. One LAV-C2U served as the "White Cell" and higher headquarters. The other LAV-C2U operated as a Company FiST vehicle in a desert environment, a capability that remained untested from the IOT&E. During the test the vehicles logged a combined to-tal of 1,301 km (808 miles) while conducting sim-ulated attacks on targets identified in the mission scenarios.

Night operations with tent and tent boot.

Operators working inside the LAV-C2U.

Because the enemy does not rest, the test team conducted night operations from the shelter provided with the vehicles. Throughout the FOT&E the test team conducted numerous communication range tests with the various nets on board the vehicle. A highlight of the test was the successful demonstration of HF communications on the move (an objective requirement) and the use of the OS-302 SATCOM antennas. Neither of these requirements was observed during the IOT&E.

Upon completion of the FOT&E execution phase Col Reeves and MCOTEA's Scientific Advisor and S-2 deployed to the MTSSF from Quantico to expedite the review and signature of the OTA Evaluation Report. Because of fiscal year funding issues with PM LAV a Quicklook report was needed at minimum to support a Milestone C decision before the start of FY10. However, the test team's outstanding effort led to a full report being ready in 12 days, which Col Reeves promptly signed. The LAV-C2U was resolved as Operationally Effective in support of the Milestone Decision Authority's decision for Full-Rate Production. It was found Operationally Suitable during the IOT&E. ▶

Inside an LAV-C2U. The Follow-on Test was specifically designed to test the Command and Control component.

Scanning for Updates

In today's testing world, emphasis is placed on testing over the life cycle of a system. Few examples better illustrate that concept and its value in the acquisition process than the AN/TPS-59 radar, fielded with Marine Air Control Squadrons since 1985. The AN/TPS-59(V)3 is the current variant of that venerable air defense radar. Following Operation Desert Storm in 1991, the Marine Corps sought improved capabilities in Theater Ballistic Missile (TBM) detection and tracking.
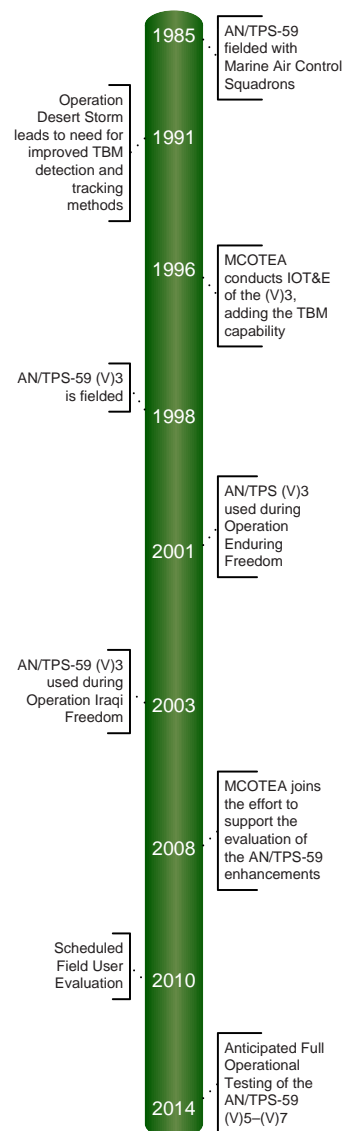
MCOTEA conducted an Initial Operational Test and Evaluation of the (V)3 radar in 1996. While MCOTEA noted some system shortfalls in the Independent Evaluation Report, the detailed findings and recommendations led to a fielding decision along with a mandate to correct deficiencies with the full involvement of MCOTEA.

The AN/TPS-59 is currently undergoing a series of Engineering Change Proposals (ECP) to maintain and enhance the radar's performance well into the next decade. Each ECP is evaluated by Marine Corps Systems Command and MCOTEA to determine the level of required testing.

In May 2010, MCOTEA and the MCSC Program Office will use findings from numerous DT events and conduct a Field User Evaluation to evaluate the changes. System changes will also require recertification for transportability and Information Assurance. The upcoming retirement of the Radar Environment Simulator will present a challenge to future operational testing; a combination of live air target testing and new Modeling and Simulation will be required to overcome this deficiency.

The AN/TPS-59 is slated to undergo a phased Product Improvement Program that will transition it from the (V)3 variant to the (V)5 with a redesigned antenna and then to the (V)7, which will meet requirements of the Three Dimensional Extended Range Radar (3DELRR) as contained in the 3DELRR Capability Development Document. The strategy of maintaining close coordination and integration of testing events between MCOTEA and the Program Office will continue, and MCOTEA will continue test and evaluation throughout the life cycle of the AN/TPS-59 radar. ⚓

1985 — AN/TPS-59 fielded with Marine Air Control Squadrons

1991 — Operation Desert Storm leads to need for improved TBM detection and tracking methods

1996 — MCOTEA conducts IOT&E of the (V)3, adding the TBM capability

1998 — AN/TPS-59 (V)3 is fielded

2001 — AN/TPS (V)3 used during Operation Enduring Freedom

2003 — AN/TPS-59 (V)3 used during Operation Iraqi Freedom

2008 — MCOTEA joins the effort to support the evaluation of the AN/TPS-59 enhancements

2010 — Scheduled Field User Evaluation

2014 — Anticipated Full Operational Testing of the AN/TPS-59 (V)5–(V)7

Eyes on the Future

S-5: Business Development/Future Operations

Urban Matters

The MCOTEA S-5 hosted the Senior Steering Committee for the Urban Environment Test Capability Study (UETC) in August. The overall UETC effort is a study co-led by Joint Forces Command and ATEC with Test Resource Management Center sponsorship. This study (with potential follow-on efforts) was initiated by a 2007 Strategic T&E Requirements Study that highlighted the significant deficiency in urban environment test and evaluation infrastructure.

Although the Army conducted a similar study in 2005–2006, this effort is the first broad-based, encompassing effort to include all the Services, OSD, Major Range and Test Facility Bases, JFCOM, and many others.

In attendance at the Quantico Corporate Center were Col Reeves, Dr. Streilein from ATEC, and other support members from the study group. Attending via VTC were Dr. Folkes, Director of the Test Resource Management Center, and several members of his staff. The agenda focused on providing an update from the ongoing UETC study and how best to integrate the study into the Joint Urban Test Capability now underway. The group discussed the study's analytical scoping and the multiple courses of action required to complete the effort. The study is scheduled to be completed by second quarter 2010.

Overall, the S-5 had another good quarter of interaction and collaboration with a range of test and evaluation colleagues. ⚓

Human Factors Professionals Make the Connection

Dr. Carlotta Boone of Team BAE Systems participated last fall in two conferences that drove home the relevance and importance of integrating human factors engineering (HFE) into test and evaluation.

Her first stop was the Department of Defense HFE Technical Advisory Group (TAG) Semi-Annual Meeting in Key West, FL, where she presented *The Roles of Human Factors in Operational Testing at MCOTEA* to a SubTAG on Test and Evaluation. Her briefing discussed the tools used to examine human factors issues and training at MCOTEA. She also reviewed her work in applying human factors to programs of record.
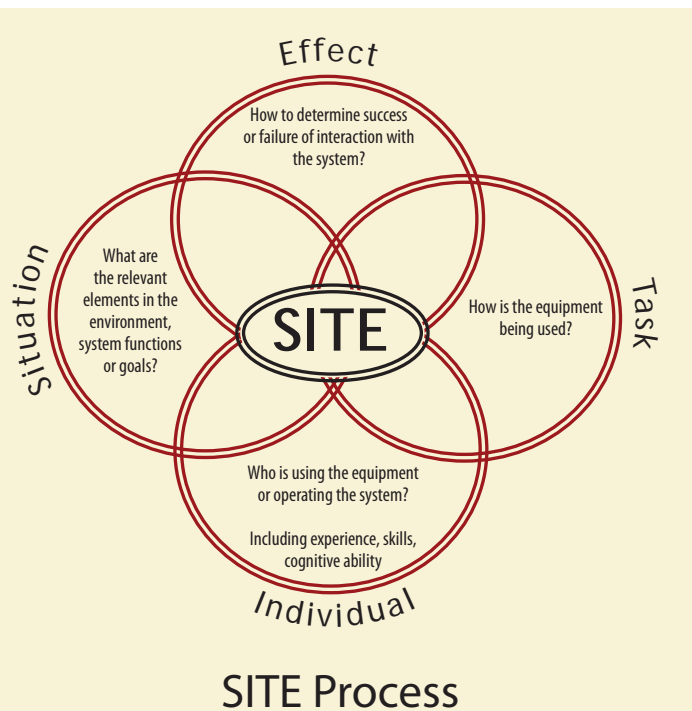
In addition to Dr. Boone's briefing, the Test and Evaluation SubTAG explored numerous aspects of system performance, including the identification of human factors requirements and the development, validation, and standardization of human factors techniques and metrics. The SubTAG also provided time for lessons learned, human factors training, and an exploration of human factors issues in management.

Dr. Boone found the conference to be highly relevant to MCOTEA's test planning process. She attended several briefings involving the application of simulation to the military environment, an area in which MCOTEA continues to grow. A briefing on workload and stress presented by the Naval Health Research Center included their use of the Infantry Immersive Trainer (IIT) at Camp Pendleton to examine stress inoculation among Marines. The IIT is an innovative training system that recreates the sights, smells, and sounds of foreign urban environments, allowing Marines to practice combat skills more realistically than with other types of training.

Of particular interest were preliminary studies that examined Marines' stress hormone levels after a live fire exercise. Marines exposed to the IIT showed a reduction in stress compared with Marines who had not interacted with the trainer and experienced no change in stress levels. This study confirms the importance of ensuring that training is as operationally realistic as possible. Follow-on studies will examine whether Marines are able to maintain stress adaptation post-deployment.

Another briefing of interest reviewed results from Noble Resolve, a series of events designed to enhance homeland defense measures and military support during natural or man-made disasters. Sponsored by Joint Forces Command in support of U.S. Northern Command, participants included Department of Homeland Security and National Guard organizations from several states and representatives from Denmark, France, and South Korea. Scenarios involved crisis situations in Virginia, Oregon, Texas, and Indiana. The exercise examined communication barriers, situational awareness, and integrated intelligence. Noble Resolve exemplifies one of the many ways the armed forces are using distributed training to increase Warfighters' abilities in global interaction.

Dr. Boone continued her travels to the Human Factors and Ergonomics Society (HFES) Annual Meeting

Effect
How to determine success or failure of interaction with the system?

Situation
What are the relevant elements in the environment, system functions or goals?

SITE

Task
How is the equipment being used?

Who is using the equipment or operating the system?

Including experience, skills, cognitive ability

Individual

SITE Process

When determining which human factors issues should be examined within a system, one tool is the SITE process (Charlton, 2002). In the SITE process, the HF expert determines relevant elements in the operational environment (hot /cold climate), characteristics of the Marine who will be using the system (experience level, workload), the characteristics of the tasks that will be performed using the system, and how to determine if the interaction between the situation, Marine, and task was successful (performance accuracy, task completion time). Based on these issues, the human factors measures to answer these questions in the operational test are developed.

Charlton,Samuel, and Thomas O'Brien, ed. "Selecting Measures for Human Factors Test." *Handbook of Human Factors Testing and Evaluation.* New Jersey: Lawrence Erlbaum Associates, 2002.

in San Antonio, TX. HFES promotes the use of technical knowledge of the interaction between man, machine, and environments to improve system effectiveness, safety, and ease of use.

At this conference Dr. Boone especially appreciated a presentation on weapon safety that discussed gun-related injuries and their connection with weapon design and operator fatigue and stress. Weapon safety affects several MCOTEA programs of record. Some common weapon design issues discussed were the fallibility of hair triggers, variations in the designs of handgrips and of sights and scopes, difficulties in checking the number of rounds in chamber, and inconsistent designs of safety locks. The weapon should also be evaluated for its ergonomic fit and ability to accommodate Marines of different anthropometric (size and proportion of the human body) characteristics.

Another briefing at the HFES Annual Meeting discussed guidelines for developing scenarios in simulation training. MCOTEA recently evaluated the Combat Convoy Simulator and is helping to define requirements for the Combined Arms Command and Control Training Upgrade System. Dr. Boone agreed with the brief, which said military scenarios should be based on the mission's goal and should include representations of the enemy and their weapon system, the terrain, and weather conditions in combat, as well as civil considerations such as representations of the civilian population.

Dr. Boone attended another briefing that discussed findings similar to those of the IIT briefing at the HFE TAG conference. This presentation discussed an experiment that compared training for clearing a building performed in a realistic environment with training provided through desktop programs and head-mounted displays. Participants who trained in an actual building with simulated combatants performed significantly higher than those whose training consisted of a desktop program or head-mounted display. As with the IIT, Warfighters' performance significantly improved when they were exposed to a highly realistic environment.

"Both of these conferences provided substantial and valuable information for MCOTEA to incorporate in test planning," said Dr. Boone. "I'm looking forward to further participation that will continue to focus and strengthen MCOTEA's attention to human factors." 🐾
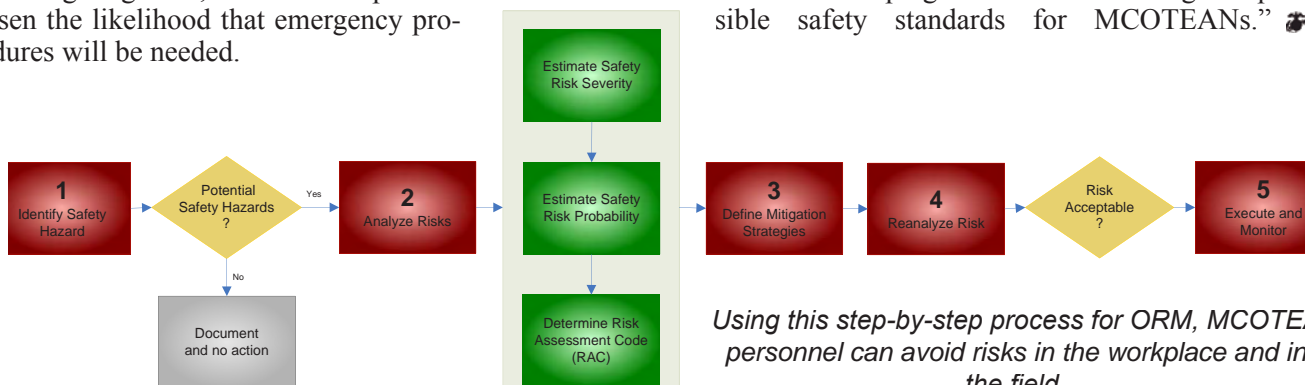
Safety All Around

MCOTEA is in the final stages of reviewing its Safety Manual, which will incorporate up-to-date information about plans for headquarters and test-site emergencies when it is released in 2nd Qtr FY10. A multi-month effort by an Integrated Product Team headed by Dr. Carlotta Boone, who supports MCOTEA as a Human Factors and Safety SME, has resulted in a comprehensive look at safety and unexpected incidents.

The manual is a one-stop-shop for contact information, required report forms, and emergency procedures, should the need arise. However, by employing the principles of Operational Risk Management (ORM), a methodical process for identifying, analyzing, and mitigating risks, MCOTEA expects to lessen the likelihood that emergency procedures will be needed.

In addition to officially basing the safety process on ORM, the manual delineates clear roles and responsibilities for handling safety issues, where appropriate test team management is of utmost importance during a crisis. Checklists and scripts to use in an emergency are part of the manual.

The Safety Manual also contains procedures for facility crises such as fire or tornado. On the preventive side, the manual addresses common hazards as well as injury prevention through better use of ergonomics. "We have a responsibility to provide a safe working environment for our personnel," comments Dr. Boone. "This manual provides the basis for helping us maintain the highest possible safety standards for MCOTEANs." 🐾

Using this step-by-step process for ORM, MCOTEA personnel can avoid risks in the workplace and in the field.

Personnel News

A group of MCOTEA's recent hails from left to right:
Maj D. Hammonds, Ms. Lacey Roderick, Mr. Manuel DeJesus, Ms. Brittney Cates, Mr. Byron Mike,
Ms.Swala Burns, Mr. Jim Forward, Ms. May Sanders, Ms. Carolyn Giles

MCOTEA Hails

Executive Office

Mr. Thomas McGowan

Combat Service Support Division

Maj Michael Hobbs

ExpeditionaryTest Division

Capt Russell Jackson
Mr. Joseph Hottendorf
Mr. Jay Neylon

Ground Combat Test Division

Maj Darryl Hammonds

MAGTF C4ISR Division

Capt Andrew Merkel
Ms. Lacey Roderick
Mr. Jim Forward

Contracting

Mr. Michael Richards
Ms. Carolyn Giles

S-1

Mr. Manuel DeJesus

Office of the Chief of Test

Mr. O'Bryan Woods

Fiscal

Ms. Darlene Wright
Ms. May Sanders
Mr. Byron Mike
LCpl Sarah Fitzpatrick

S-2 Decision Sciences

Ms. Brittney Cates
Ms. Swala Burns

Promotions and Awards

In January, PFC Sarah Fitzpatrick was promoted to LCpl at the MCOTEA facility. She is pictured with Capt Shoemaker (left) and Cpl Honeycutt (right) of MCOTEA's fiscal office.

Cpl Honeycutt Receives Navy and Marine Corps Achievement Medal

MCOTEA proudly announces that on 8 January 2010, Cpl Grant Honeycutt received the Navy and Marine Corps Achievement Medal. Cpl Honeycutt was recognized for "superior performance of his duties as Financial Budget Technician." The citation continues, "Cpl Honeycutt's superior financial ability enabled the Activity to close out Fiscal Year 2009 at 100 percent obligation spanning across four different types of appropriation. His knowledge and attention to detail enabled the Activity to maintain the highest level of financial accuracy...Corporal Honeycutt's initiative, perserverance, and total devotion to duty reflected credit upon him and were in keeping with the highest traditions of the Marine Corps and the United States Naval Service." Congratulations, Cpl Honeycutt.

Hitting the Road: Events to Note

National Defense Industrial Agency (NDIA)

2010 Ground Robotics Capabilities
Conference and Exhibition
Doral
Miami, FL
16—18 March 2010

11th Annual Science & Engineering
Technology Conference/DOD Tech
Exposition
Charleston Convention Center
North Charleston, SC
13—15 April 2010

Military Operations Research Society

Irregular Warfare III—Improving
Analytical Support to the Warfighter:
Campaign Assessments, Operational
Analysis, and Data Management
Lockheed Martin, Orlando, FL
19—22 April 2010

Operational Test Agency Commanders' Conference
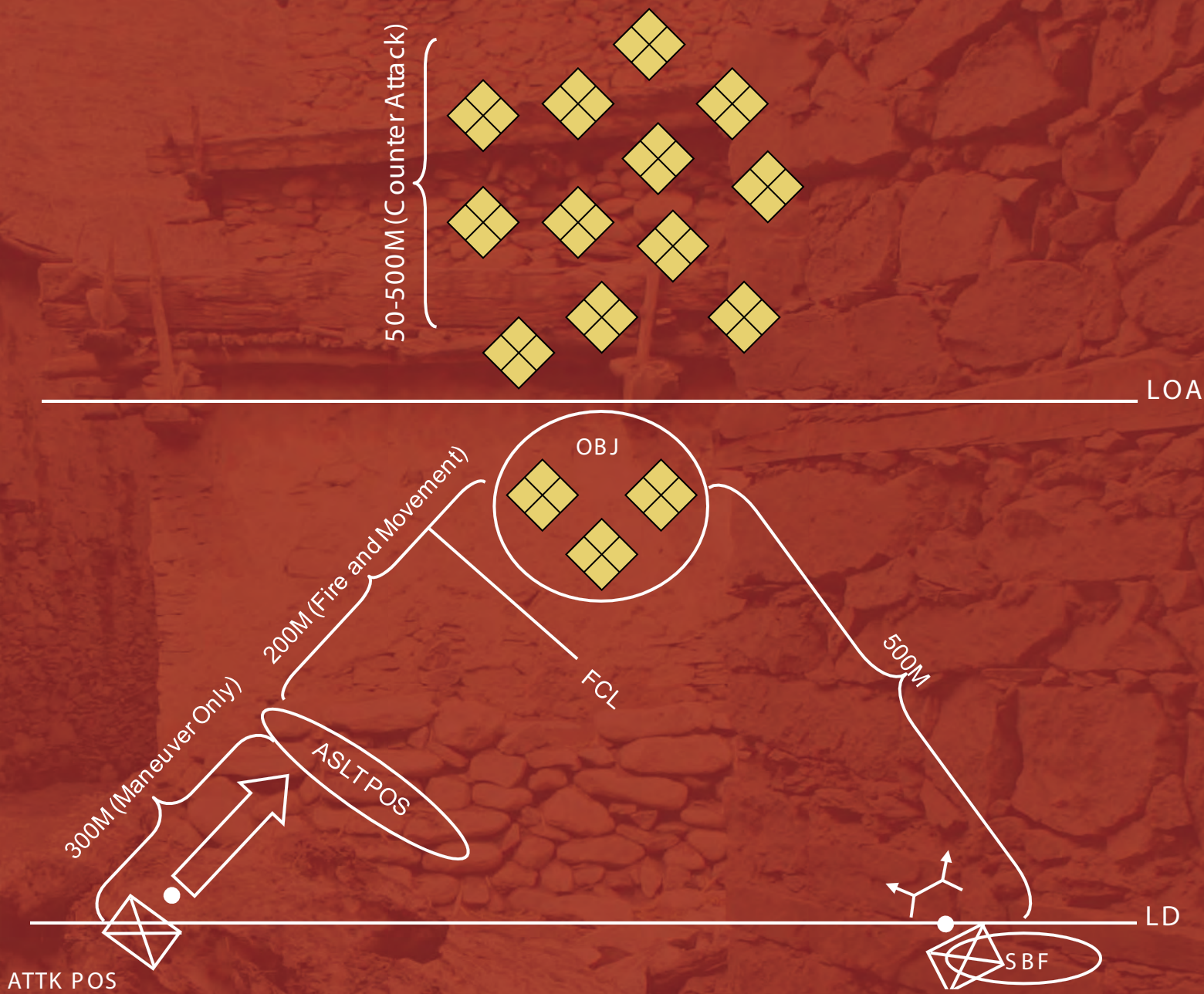
Edwards AFB, CA
31 March—1 April 2010

International Test and Evaluation Association (ITEA)

Net-Ready KPP Short Course
30 March—1 April 2010

2010 Test Instrumentation Workshop
Las Vegas, NV
10—13 May 2010

2010 Test Week
Huntsville, AL
14—17 June 2010

2010 Technology Review Conference
Charleston, SC
20—22 July 2010

Notional UFHD-Supported Test Trial

◈ UFHD Target

Labels in figure:
50-500M (Counter Attack)
LOA
OBJ
200M (Fire and Movement)
FCL
500M
300M (Maneuver Only)
ASLT POS
LD
SBF
ATTK POS